

sought for will not be accomplished; and, as the operation takes time and must be done on a patient who is already hard hit, it to this extent lessens the patient's chance of recovery. This problem is like so many more in surgery in that it can and should be used in certain cases and is strongly contraindicated in others, and its successful use depends on the judgment of the surgeon.

The after-treatment of perforated ulcer consists in rest for the part involved by the avoidance of food ingestion and peristalsis and by the use of appropriate measures of defence for the peritoneum.

The patient occupies the high Fowler position so that the infectious fluid may gravitate from the absorptive diaphragmatic area to the safer pelvic zone. No fluid is given by mouth for thirty-six hours and the patient is kept thereafter on a liquid diet and semi-fluid for eighteen days. The Murphy method of giving saline by continuous enteroclysis is employed routinely; otherwise the treatment is that of any section case for a grave lesion. Vomiting, and even nausea, if at all persistent, should be treated by lavage and repeated as often as it is necessary permanently to relieve vomiting.

THE CELLULAR ELEMENTS OF THE BLOOD IN TUBERCULOSIS.

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RED CELLS. The various authorities upon this subject seem to agree in that there is but little change, if any, from the normal in the red count or hemoglobin percentage in tuberculosis, excepting in advanced cases shortly before death when both are decreased, sometimes to a marked degree.

In the routine examination of the blood of cases admitted to Las Animas Hospital, we found this to be so uniformly true that we discontinued making the red count and the estimation of hemoglobin as routine procedures. In a large number of cases the reds averaged above 5,000,000 per cubic centimeter and the hemoglobin 85 per cent.

It has been found, however, that the red cells are pathological to the extent of resisting the hemolytic action of salt solution at least, and from this fact a method¹ of obtaining the hemolytic index

¹ The method for determining the hemolytic index is, briefly, as follows: Dilute the blood in the red cell pipette with an accurate 0.35 per cent. NaCl solution. Allow to stand five or ten minutes, and proceed to count the visible (non-hemolysed) red cells. Usually it will be possible, and preferable, to count the cells on that part of the slide used for counting leucocytes. In far advanced cases the central ruled area may have to be used. 150,000 divided by the number of cells found per cubic millimeter of undiluted blood will give the hemolytic index.

has been devised which is simple, rapid, and accurate. We believe the hemolytic index will prove of great value in differential diagnosis, but its greatest field of usefulness is in prognosis.

The lower the hemolytic index the less favorable the prognosis, irrespective of the stage of the disease as determined by physical diagnostic methods, clinical symptoms, etc., though, as a rule, a low hemolytic index will be accompanied by the physical signs and symptoms of advanced tuberculous involvement, and invariably by a low lymphocyte percentage. The normal hemolytic index is 1; cases in which it does not fall below 0.5 we regard as favorable, those not below 0.3 as guardedly favorable, those below 0.3 as unfavorable; in the majority of these latter cases death will occur in from one to ten weeks.

PLATELETS. In tuberculosis these present a normal or a reduced count, which is readily explained by the increased resistance of the red cells. It was while trying to determine the pathological cause of this resistance that lead one of the writers² of this paper to discover that the normal red-blood cell is nucleated, these nuclei becoming the platelets upon the destruction and disintegration of the red cells.

WHITE CELLS. The following data relative to the total white and differential counts has been obtained from 577 cases, in which the blood has been studied in intimate association with the clinical side of the cases.

We regret that our results are somewhat incomplete, owing to the fact that we have not had incipient cases under treatment. The cases being divided as follows: 133 moderately advanced cases, in which the local involvement was confined to the lungs, both lungs presenting lesions in each case; 412 advanced cases, in all of which both lungs were involved, a number of these cases presenting secondary involvements of joints, bone, throat, and the genito-urinary tract; 32 far-advanced cases, most of which presented terminal involvements of larynx, intestinal tract, liver, kidneys, spleen, and brain. Had incipient cases entered into these statistics, it seems probable that the only difference made in the table would have been a reduction of the average white count.

WHITE COUNT. The text-books furnish us with but little information of value relative to the white count, simply stating that in tuberculosis it is slightly increased, averaging about 13,000. This is true, but very misleading. In reality the white count steadily increases as the disease progresses, and, per contra, decreases as the disease improves. The various stages of the disease can be determined with marked accuracy by the white count in most instances, thereby checking the physical and clinical findings. This is well shown in the table given below.

² King will contribute an article on the Erythrocytic Nuclei of Normal Human Blood to the *Journal of Medical Research*, vol. xxiv, No. 1.

Polymorphonuclear Neutrophiles. The teaching has been that the percentage of these cells is reduced in tuberculosis, but by referring to the table it will be seen that the reverse is the case. Contrary to the general opinion, we do not believe that these cells have any pronounced phagocytic action in tuberculosis. On the contrary, an increase in the percentage of these cells makes the prognosis less favorable.

Lymphocytes. We have also been taught that in tuberculosis the lymphocytes are increased; in fact, that an increase in these cells is diagnostic of the disease. That neither of these premises is correct is well shown by the table. They are not even an index of the stage of the disease, which is also well demonstrated in the table by the figures under the heading lymphocyte percentage range.

We believe them to be the most important white cell in relation to tuberculosis, considering them to be the phagocytic agents in this disease for the following reasons:

1. Because patients admitted with a high lymphocyte percentage invariably improve more rapidly and consistently than do those in which the percentage of these cells is low. This comparison applies to patients in the same stage of the disease.

2. As the patient improves the percentage of lymphocytes increases directly as the improvement.

3. Progressive failure of the patient is invariably coincident with a decreasing lymphocyte percentage.

4. When the lymphocyte percentage is down to 10 the prognosis is bad; when down to 6 the patient will most probably die within six to ten weeks; when down to 3 death is but a matter of days.

The hemolytic index and lymphocyte percentage go hand in hand, a rising index is coincident with an increasing lymphocyte percentage and vice versa.

Other Cells. The eosinophiles and large mononuclears retain a normal count.

TABLE.

	Moderately advanced cases. White count up to and including 10,000.	Advanced cases. White count from 10,000 up to and including 20,000.	Far advanced cases. White count above 20,000.	All cases. White count from 5000 to 35,200.
Total number of cases	133	412	32	577
Average white count	8500	13,415	25,275	12,339
Average lymphocyte percentage	32.17%	20.8%	18.8%	29.01%
Cases in which lymphocytes were below 30 per cent.	65	258	29	352
Cases in which lymphocytes were above 30 per cent.	65	141	3	209
Cases in which lymphocytes were 30 per cent.	3	13	0	16
Lymphocyte percentage range	7% to 60%	3% to 65%	6% to 40%	3% to 65%

CONCLUSIONS. 1. In uncomplicated cases of tuberculosis the average number of red cells is normal or above excepting during a short time prior to death.

2. The hemoglobin percentage averages about 85 per cent. excepting during a short time prior to death.

3. The red cells exhibit an increased resistance to the hemolytic action of salt solutions, this resistance, as a rule, being increased directly as the progress of the disease.

4. Resistance to hemolysis will probably be found of diagnostic value.

5. The prognosis becomes less and less favorable as the hemolytic index falls.

6. The hemolytic index and lymphocyte percentage bear a direct relationship in prognosis.

7. The total white count increases directly as the disease progresses.

8. In most instances the stage of the disease, in uncomplicated cases, can be more or less accurately determined by the total white count.

9. The polymorphonuclear neutrophiles have but little if any phagocytic action in this disease.

10. A high polymorphonuclear percentage makes a bad prognosis.

11. It is strongly probable that the lymphocytes are markedly phagocytic in tuberculosis.

12. A high percentage of lymphocytes is a very favorable prognostic index.

13. The following blood findings are positive proof of improvement in any given case: (a) Decreasing white count; (b) falling polymorphonuclear percentage; (c) rising hemolytic index; (d) rising lymphocyte percentage.

14. Blood examinations should be made coincident with every physical examination, otherwise the physician misses most valuable information relative to his patients condition.

RELAXATION OF THE SACRO-ILIAC JOINTS AS A CAUSE OF SCIATICA AND BACKACHE:

WITH NEW POINTS IN THE DIAGNOSIS.

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SACRO-ILIAC disease is commonly overlooked by doctors. It is considered to be rheumatism, or more commonly sciatica, and is treated accordingly, mostly by salicylates, hydrotherapy, diet,